

FIG. 1

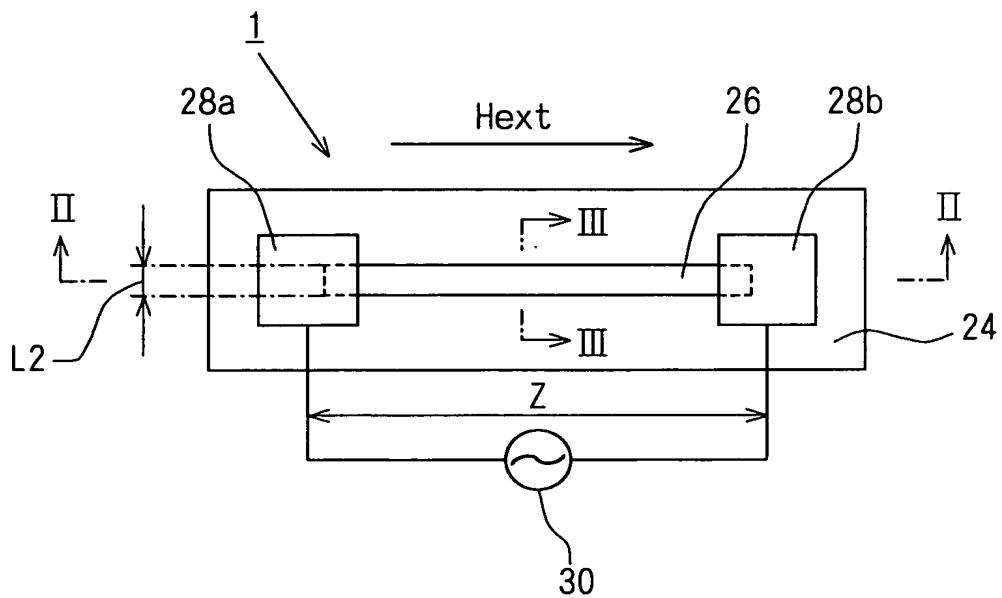


FIG. 2

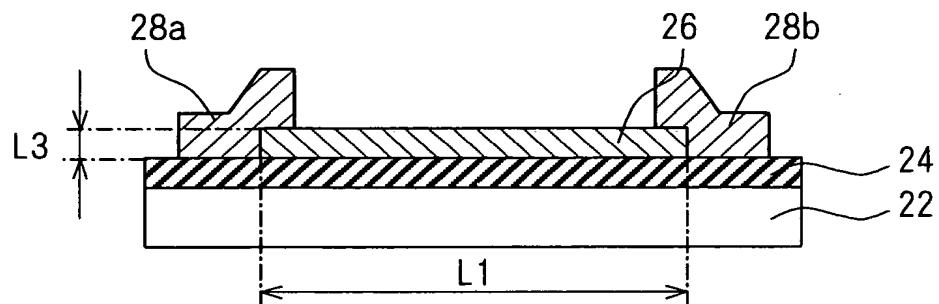


FIG. 3

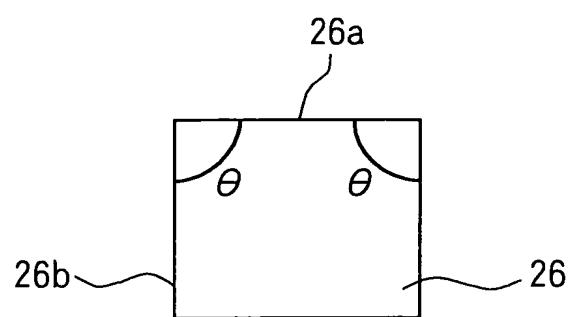


FIG. 4A

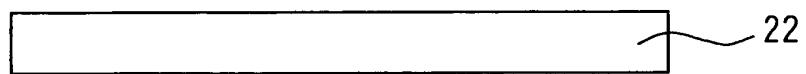


FIG. 4B



FIG. 4C

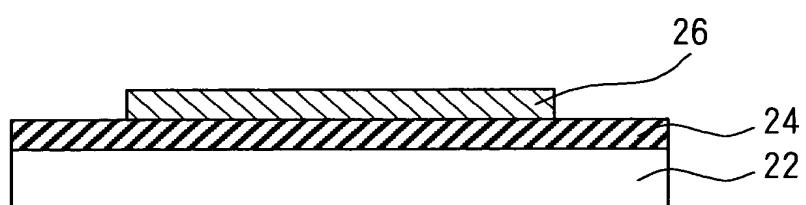


FIG. 5

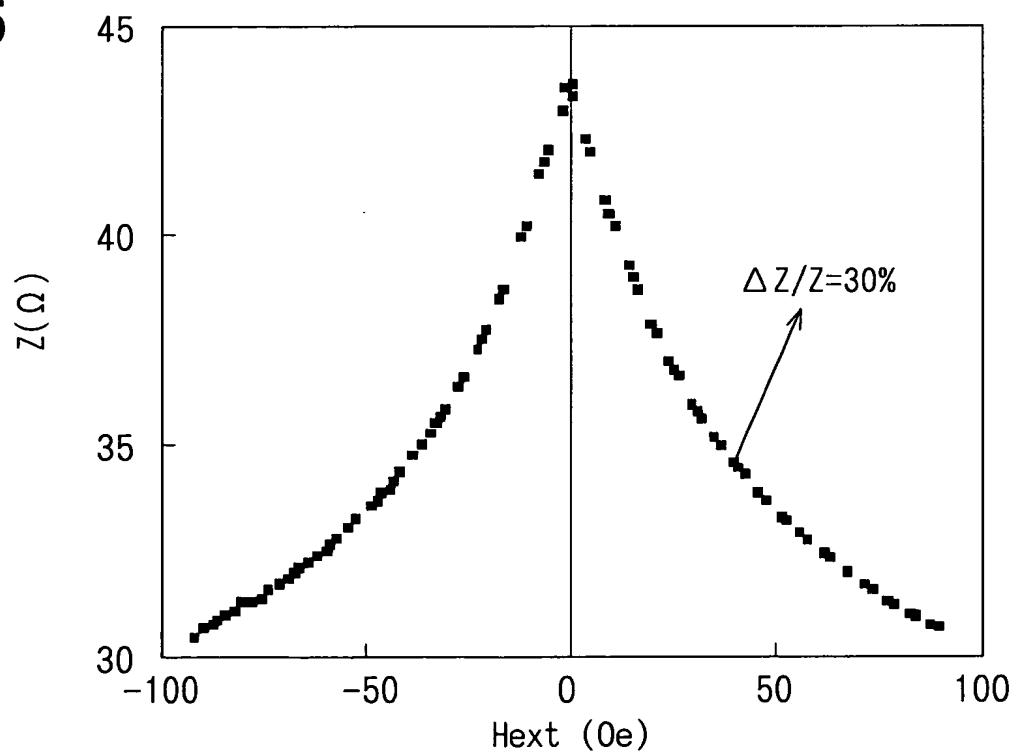


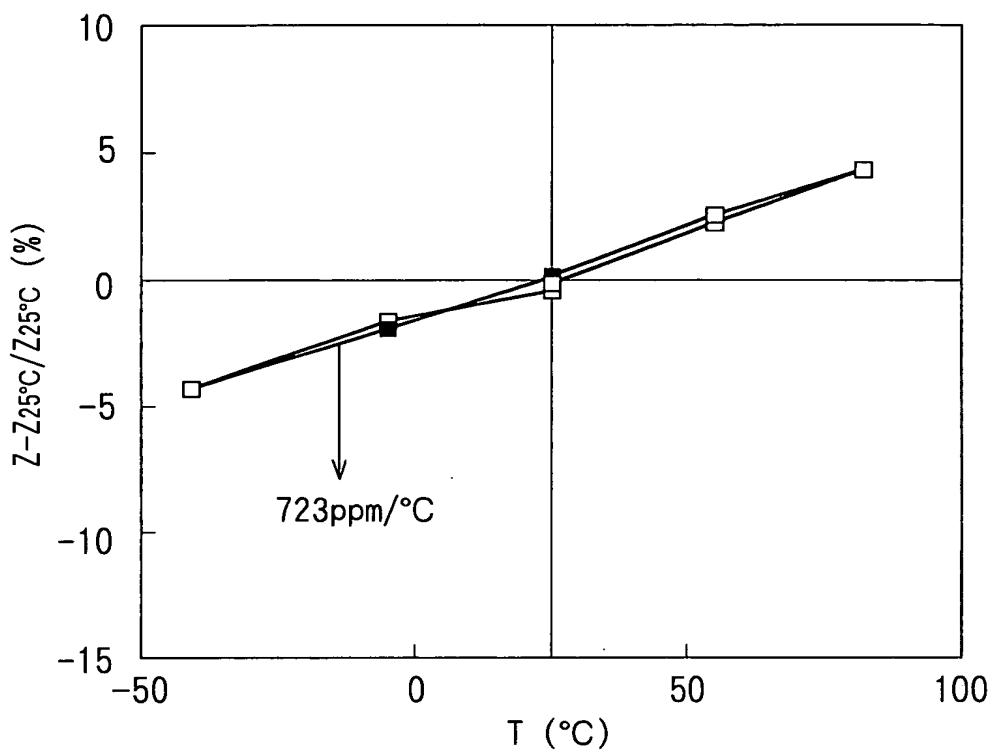
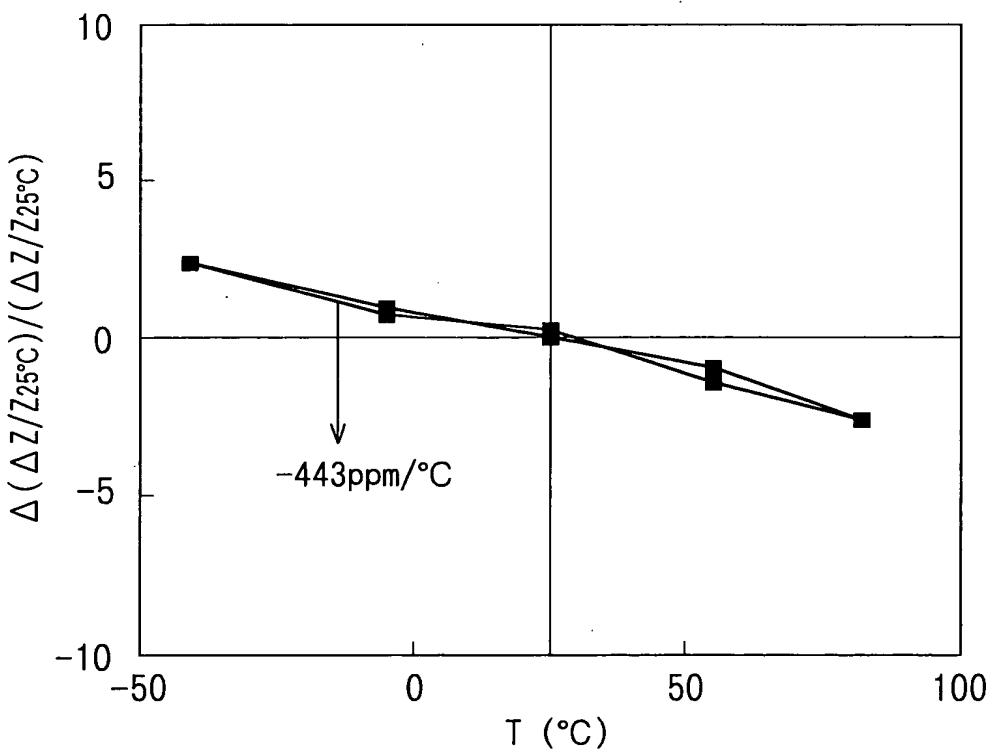
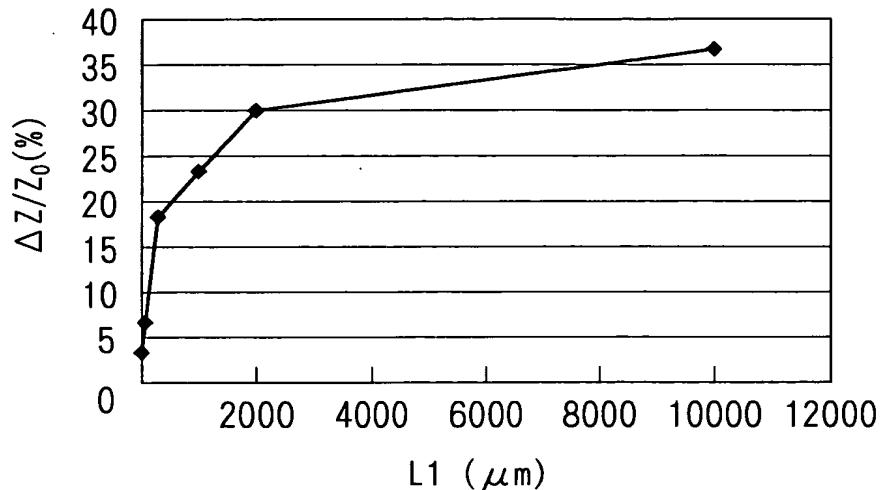
FIG. 6**FIG. 7**

FIG. 8

DEVICE NO.	COMPOSITION	L ₃ (μ m)	$\Delta Z/Z_0$ (%)	$\Delta Z_0/\Delta T$ (ppm/ $^{\circ}$ C)	$\Delta(\Delta Z/Z_0)/\Delta T$ (ppm/ $^{\circ}$ C)
S11	Ni ₈₁ Fe ₁₉	2	30	723	-443
S12	Ni ₈₁ Fe ₁₉	1	23	875	347
S13	Ni ₈₄ Fe ₁₆	2	28	175	385
S14	Ni ₇₈ Fe ₂₂	2	32	965	115
S15	Ni ₉₀ Fe ₁₀	2	28	-1276	-1742
S16	Ni ₆₅ Fe ₃₅	2	22	3388	2172
S17	Co ₇₃ Si ₁₂ B ₁₅	2	2	4285	-2414
S18	Co ₈₅ Nb ₁₂ Zr ₃	2	6	275	-513

FIG. 9

DEVICE NO.	COMPOSITION	L ₁ (μ m)	L ₂ (μ m)	L ₃ (μ m)	$\frac{\alpha}{=L1/L2}$	$\frac{\beta}{=L2/L3}$	$\Delta Z/Z_0$ (%)
S21	Ni ₈₁ Fe ₁₉	20	10	2	2	5	3
S22	Ni ₈₁ Fe ₁₉	50	10	2	5	5	6
S23	Ni ₈₁ Fe ₁₉	300	10	2	30	5	18
S24	Ni ₈₁ Fe ₁₉	1000	10	2	100	5	23
S25	Ni ₈₁ Fe ₁₉	10000	10	2	1000	5	36

FIG. 10**FIG. 11**

DEVICE NO.	COMPOSITION	L_1 (μm)	L_2 (μm)	L_3 (μm)	$\alpha = L_1/L_2$	$\beta = L_2/L_3$	$\Delta Z/Z_0$ (%)
S31	$\text{Ni}_{81}\text{Fe}_{19}$	2000	4	2	500	2	3
S32	$\text{Ni}_{81}\text{Fe}_{19}$	2000	7	2	286	3.5	29
S33	$\text{Ni}_{81}\text{Fe}_{19}$	2000	20	2	100	10	26
S34	$\text{Ni}_{81}\text{Fe}_{19}$	2000	50	2	40	25	21
S35	$\text{Ni}_{81}\text{Fe}_{19}$	2000	120	2	17	60	8

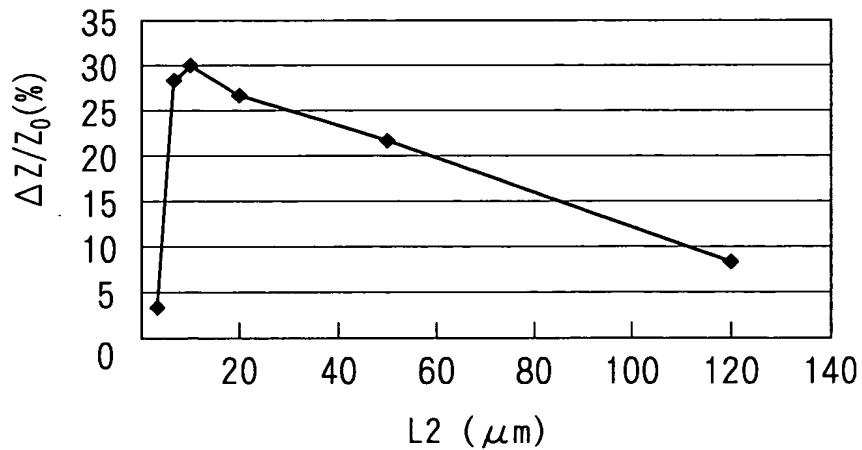
FIG. 12

FIG. 13

DEVICE NO.	COMPOSITION	L1 (μm)	L2 (μm)	L3 (μm)	$\alpha = L_1/L_2$	$\beta = L_2/L_3$	$\Delta Z/Z_0$ (%)
S41	Ni ₈₁ Fe ₁₉	2000	10	0.15	200	67	4
S42	Ni ₈₁ Fe ₁₉	2000	10	0.3	200	33.3	13
S43	Ni ₈₁ Fe ₁₉	2000	10	0.5	200	20	18
S44	Ni ₈₁ Fe ₁₉	2000	10	1	200	10	23
S45	Ni ₈₁ Fe ₁₉	2000	10	2	200	5	30
S46	Ni ₈₁ Fe ₁₉	2000	10	5	200	2	38

FIG. 14

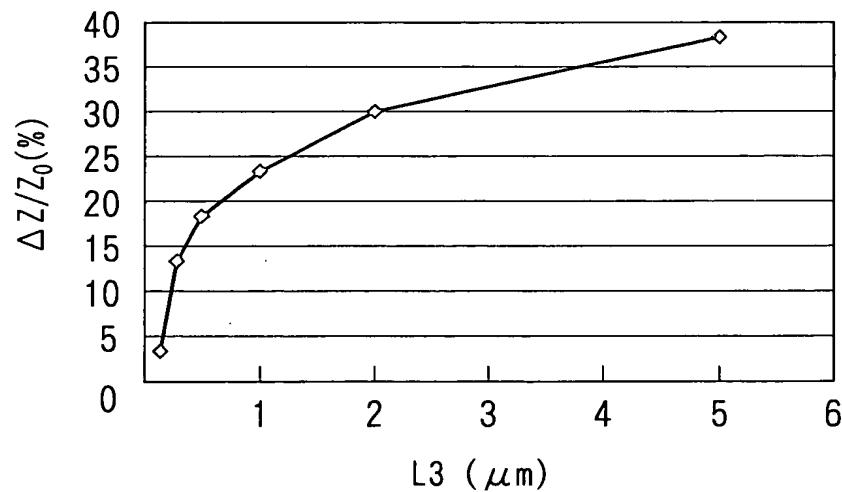


FIG. 15

DEVICE NO.	COMPOSITION	L_3 (μm)	GRAIN SIZE (nm)	SURFACE ROUGHNESS (nm)	$\Delta Z/Z_0$ (%)
S51	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	10	30
S52	$\text{Ni}_{81}\text{Fe}_{19}$	2	50	10	28
S53	$\text{Ni}_{81}\text{Fe}_{19}$	2	100	10	25
S54	$\text{Ni}_{81}\text{Fe}_{19}$	2	500	10	16
S55	$\text{Ni}_{81}\text{Fe}_{19}$	2	1500	10	6
S56	$\text{Ni}_{81}\text{Fe}_{19}$	2	3000	10	2

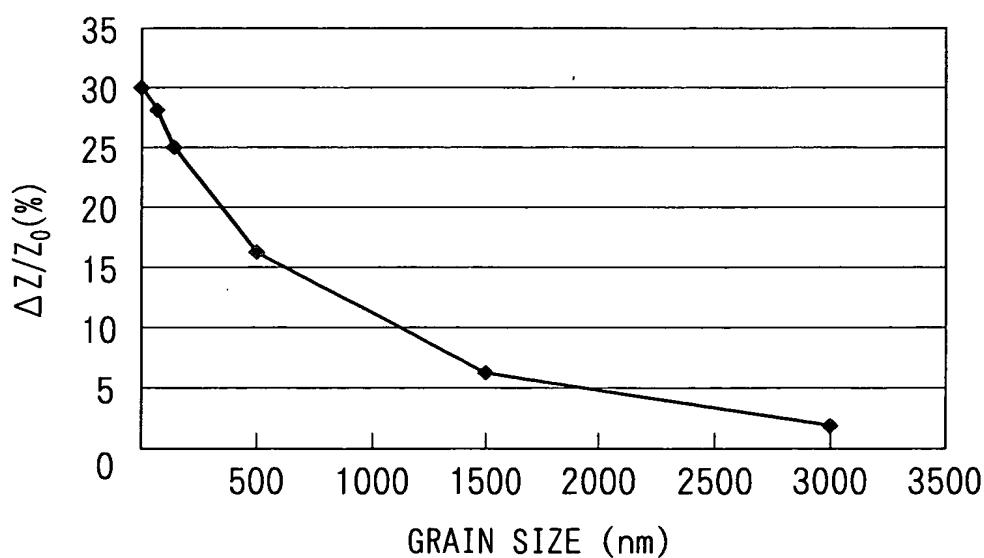
FIG. 16

FIG. 17

DEVICE NO.	COMPOSITION	L_3 (μm)	GRAIN SIZE (nm)	SURFACE ROUGHNESS (nm)	$\Delta Z/Z_0$ (%)
S61	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	5	30
S62	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	50	30
S63	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	150	27
S64	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	500	18
S65	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	1500	8
S66	$\text{Ni}_{81}\text{Fe}_{19}$	2	10	3000	6

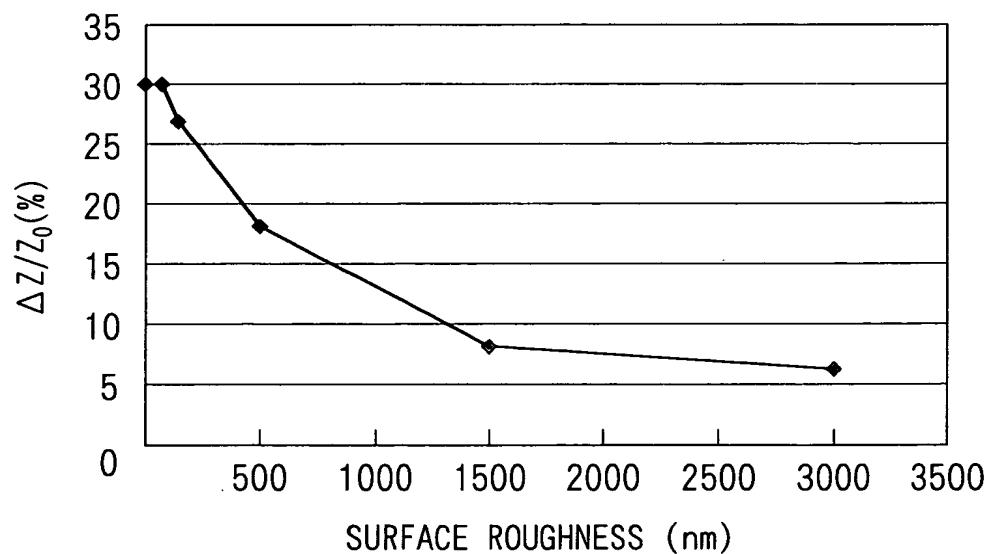
FIG. 18

FIG. 19

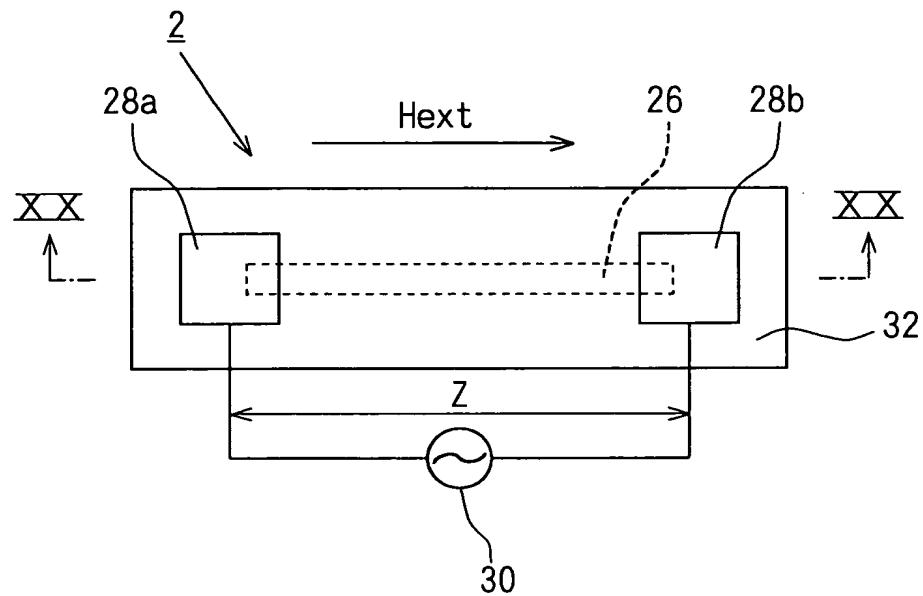


FIG. 20

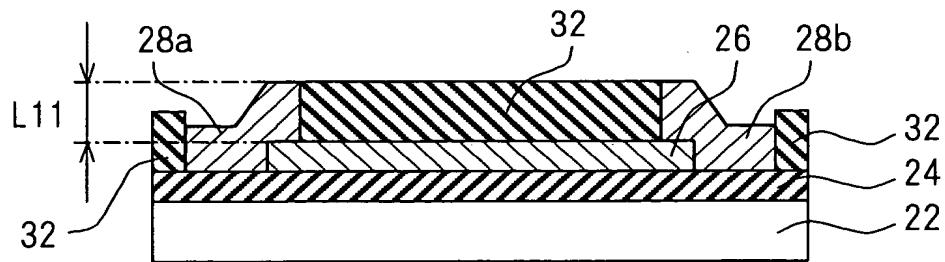


FIG. 21

DEVICE NO.	PROTECTION	L11 (μm)	σ (MPa)	BEFORE $\Delta Z/Z_0$ (%)	AFTER $\Delta Z/Z_0$ (%)
S201	SiN	0.1	-120	30	8
S202	SiN	0.3	-200	30	30
S203	SiN	0.5	-100	32	32
S204	SiN	1	-800	16	15
S205	SiN	1	-120	30	30
S206	SiN	1	400	12	14
S207	SiN	2	-300	28	28
S208	SiN	2	-50	30	30
S209	SiN	5	-180	25	25
S210	SiO ₂	0.1	50	26	5
S211	SiO ₂	0.5	10	32	32
S212	SiO ₂	0.5	20	30	30
S213	SiO ₂	1	-1000	14	15
S214	SiO ₂	1	30	28	28
S215	SiO ₂	1	50	26	26
S216	SiO ₂	1	350	14	15
S217	SiO ₂	2	80	20	20
S218	SiO ₂	3	50	30	30
S219	—	0	0	30	8

FIG. 22

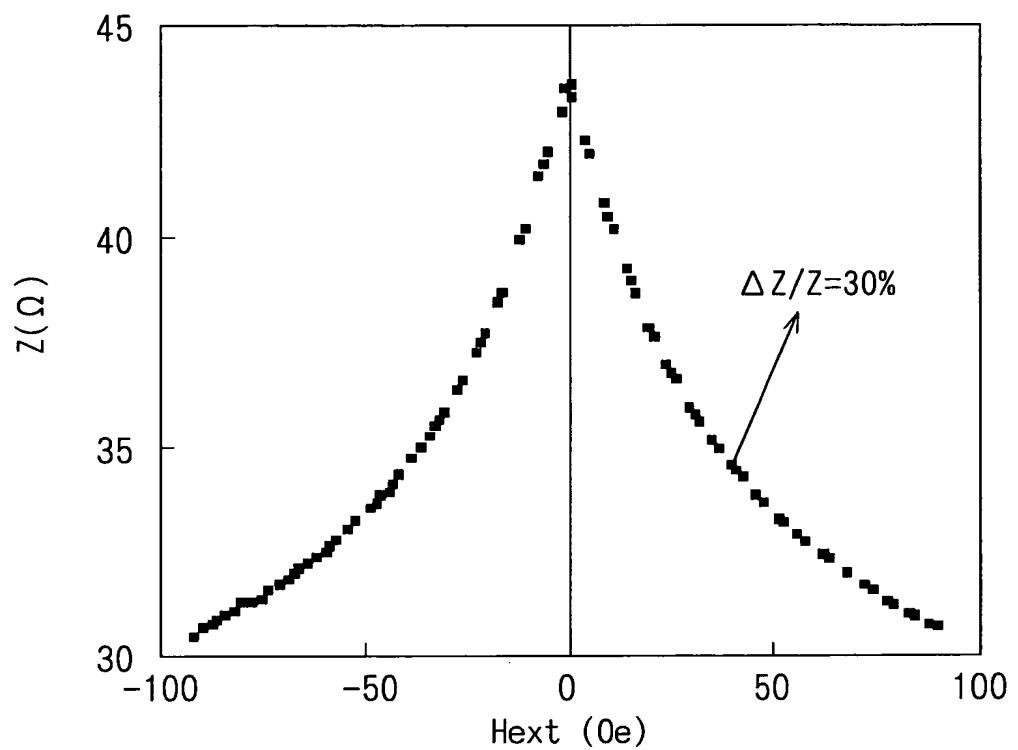


FIG. 23

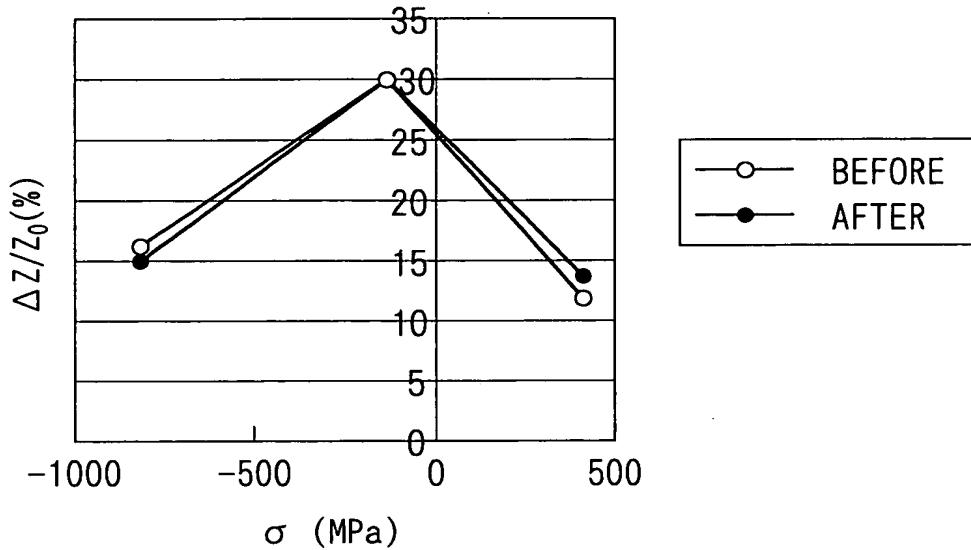


FIG. 24

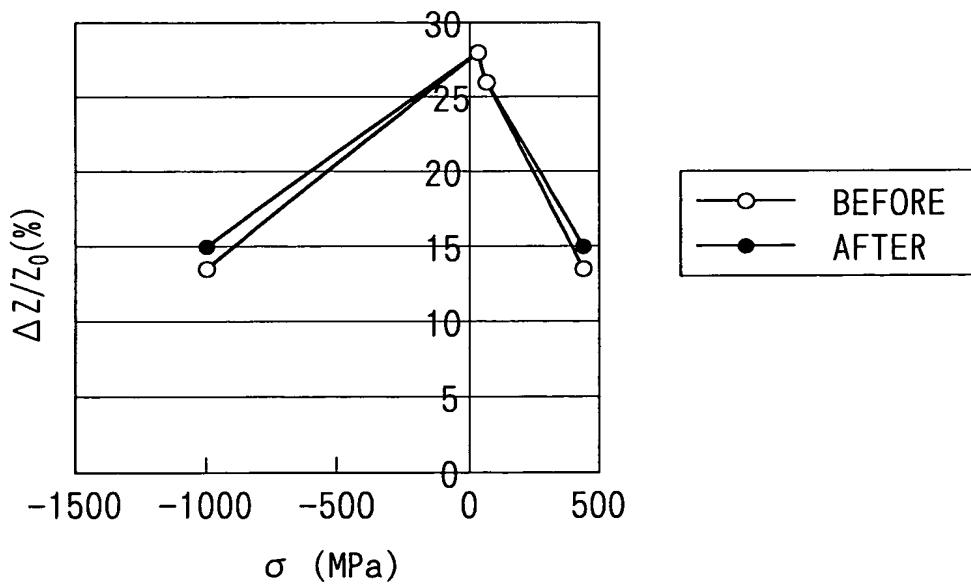


FIG. 25

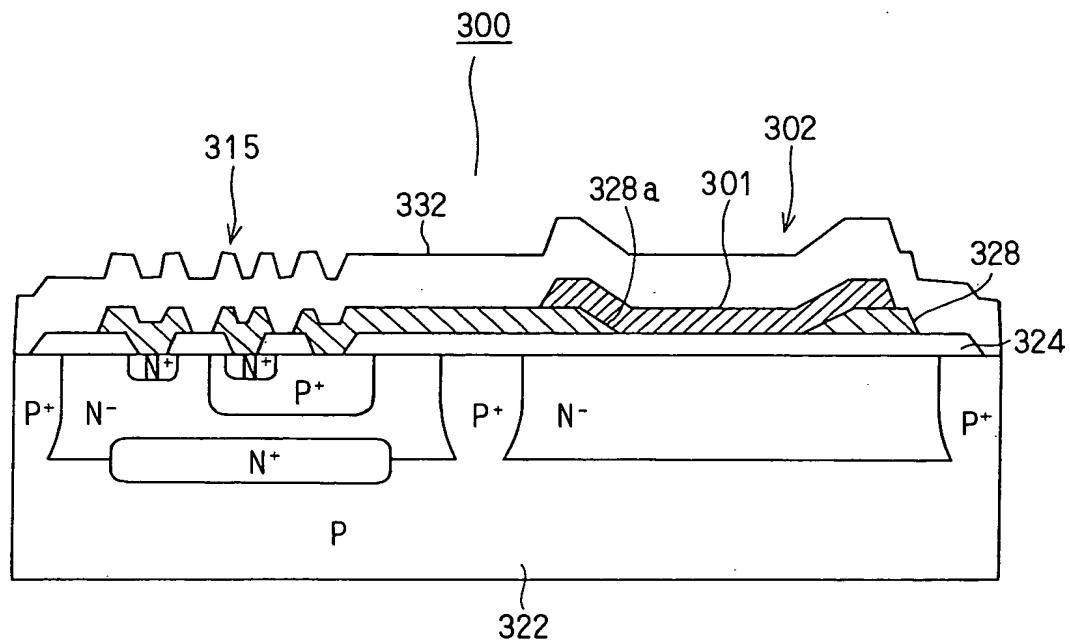


FIG. 26

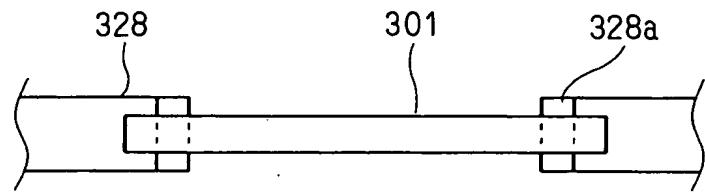


FIG. 27

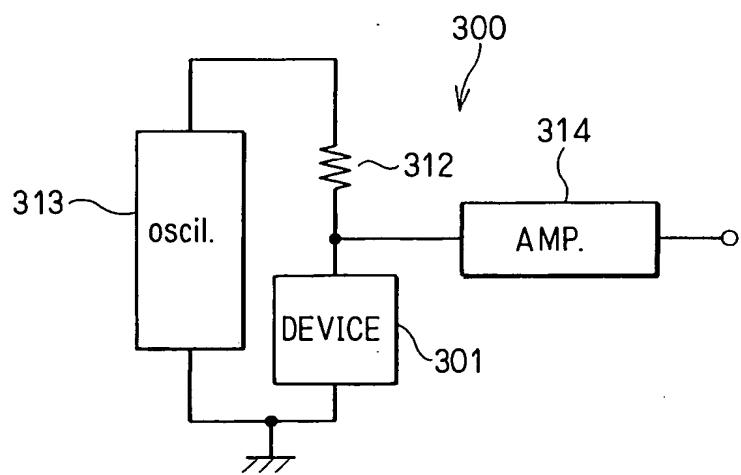


FIG. 28

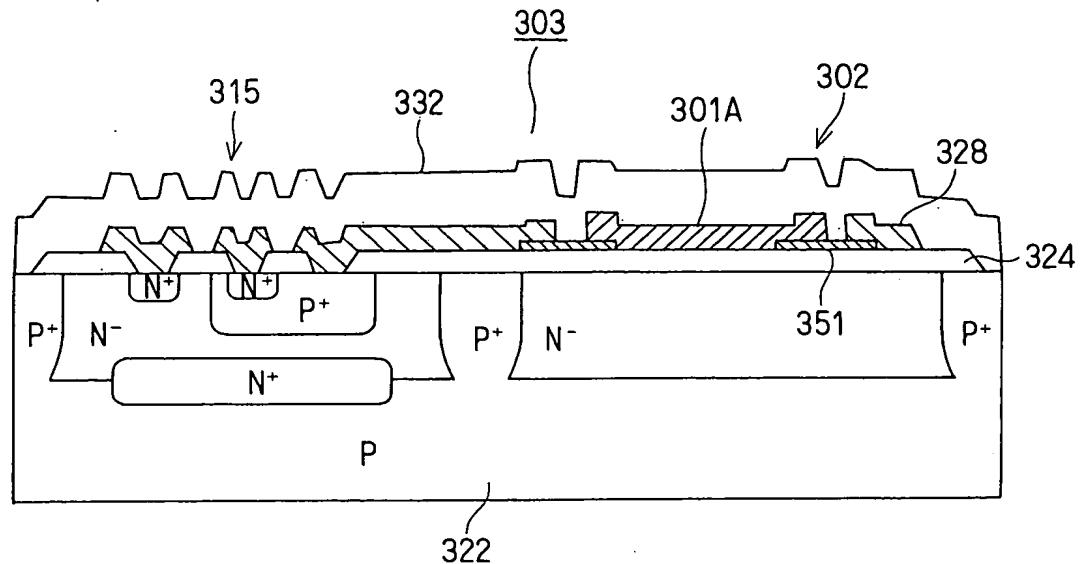


FIG. 29

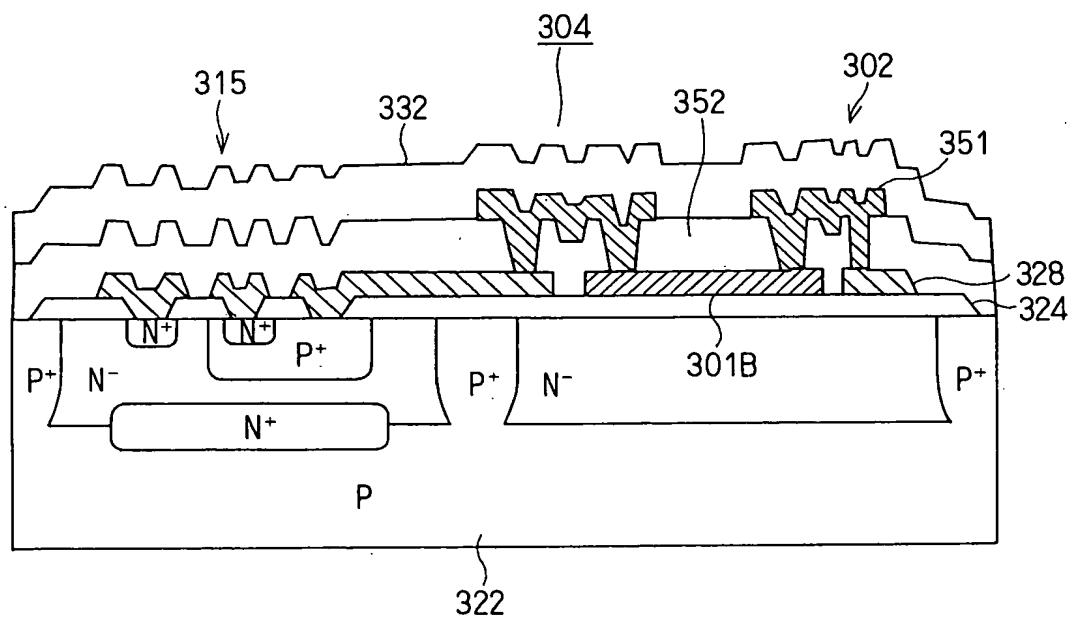


FIG. 30

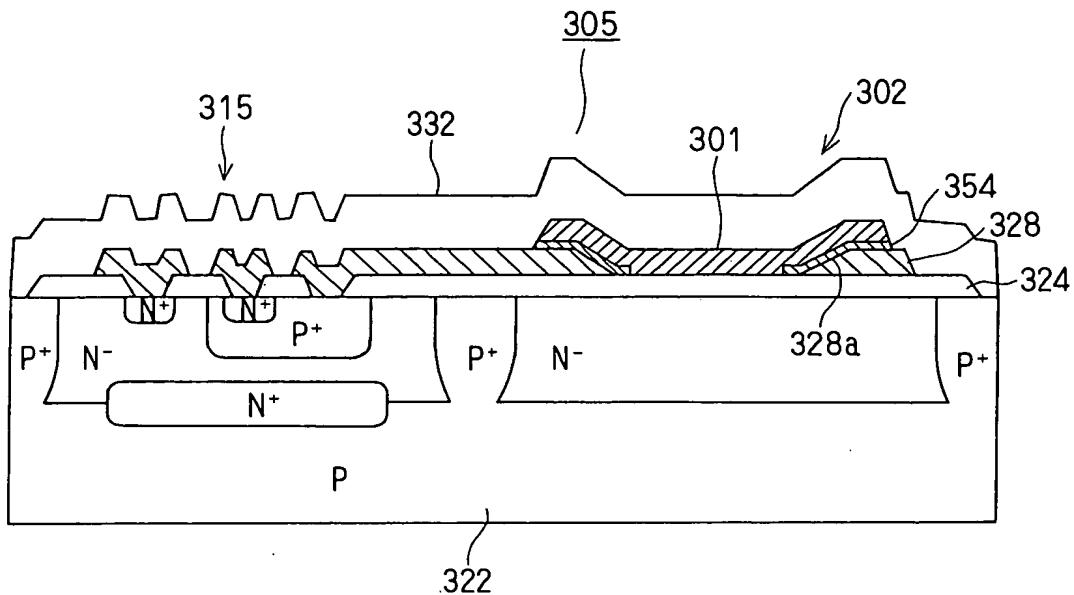


FIG. 31

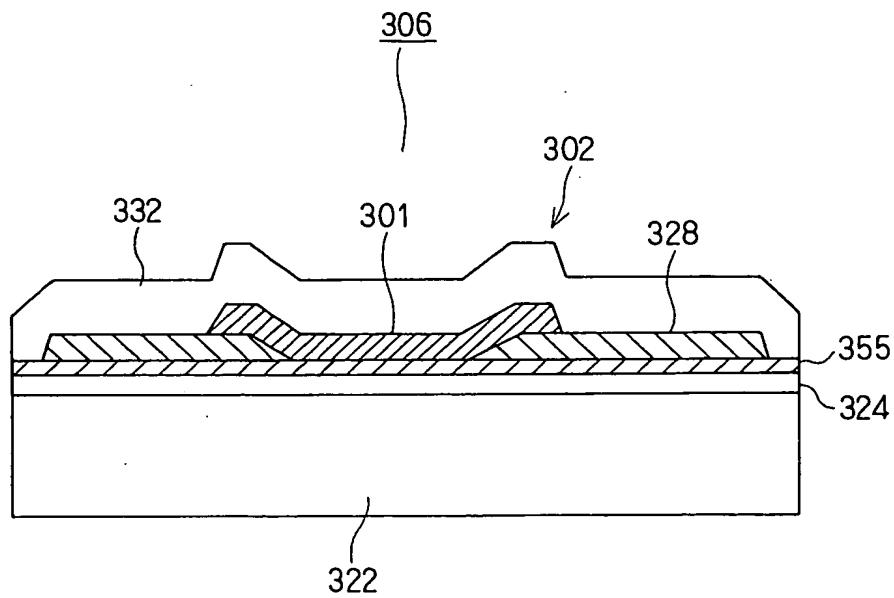


FIG. 32

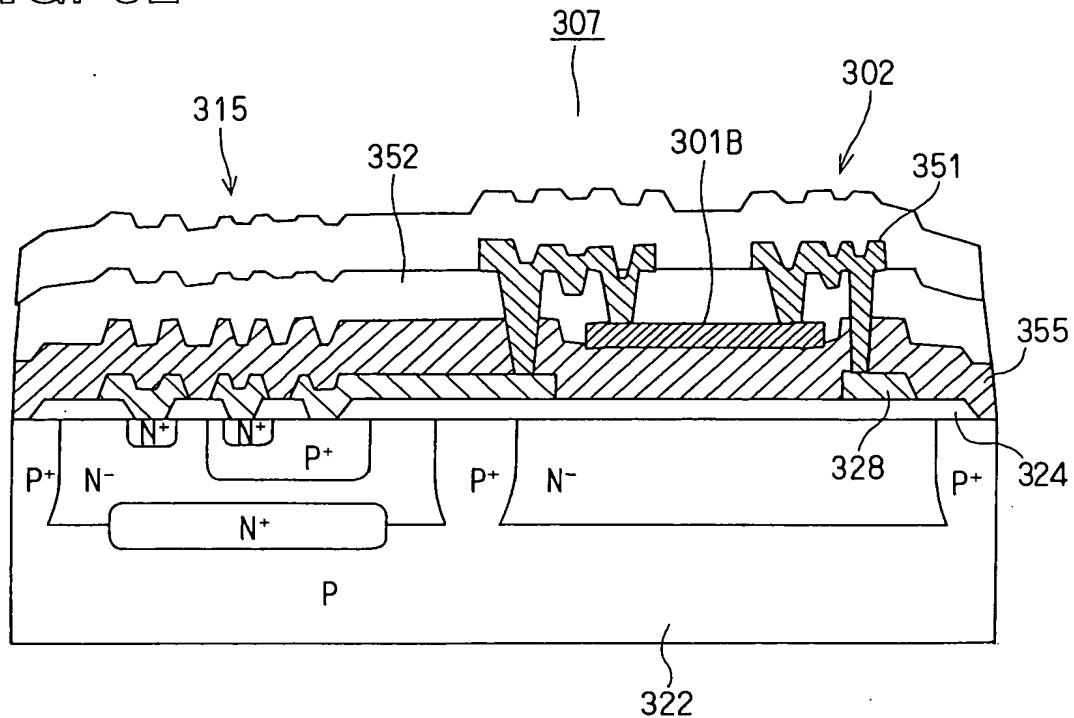


FIG. 33

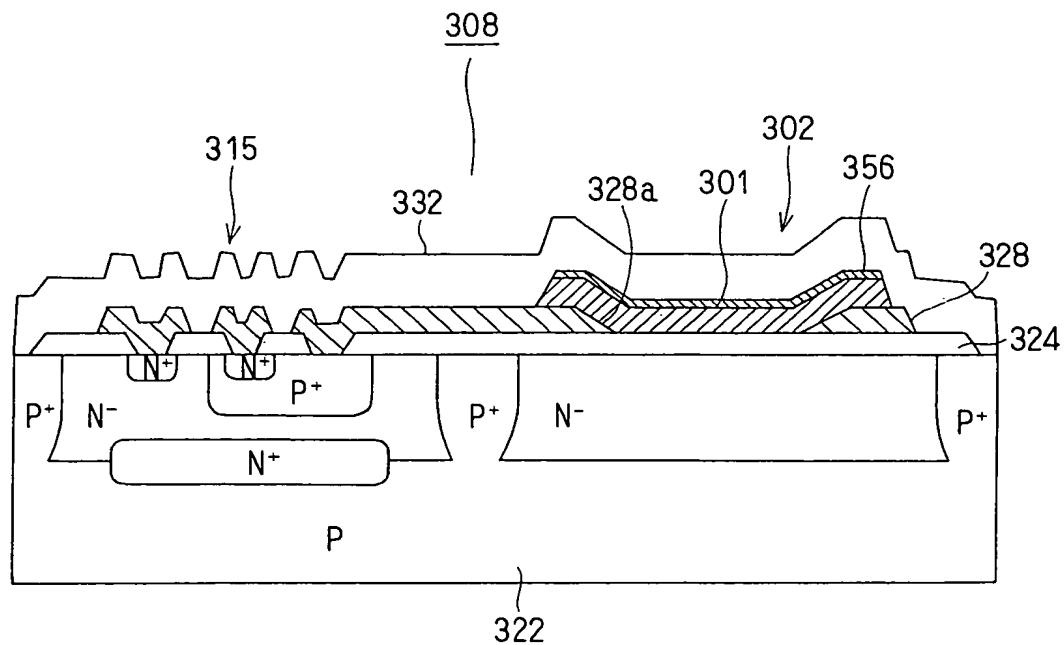


FIG. 34

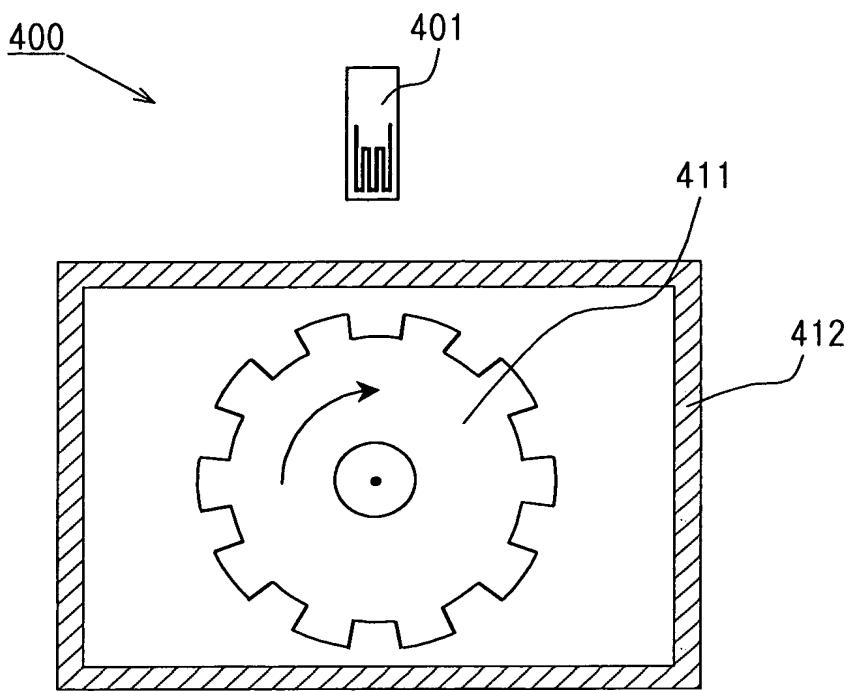


FIG. 35A

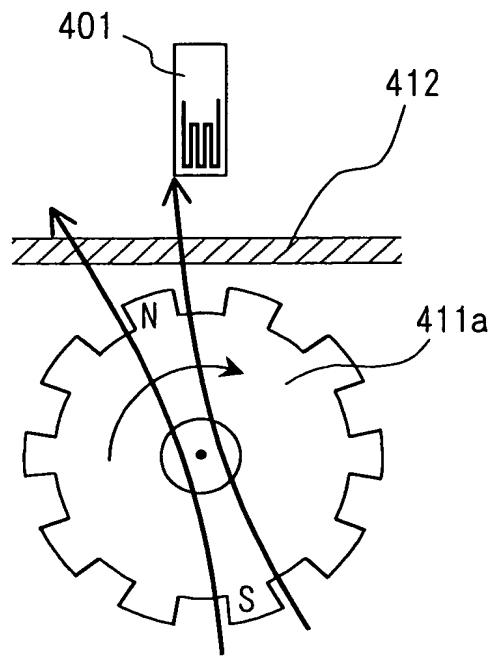


FIG. 35B

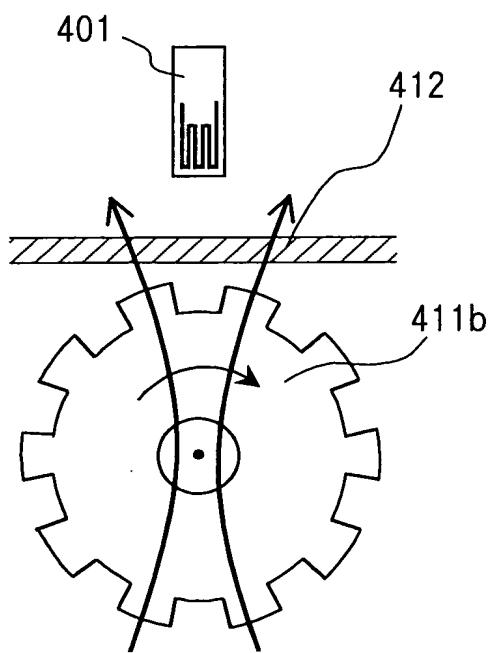


FIG. 35C

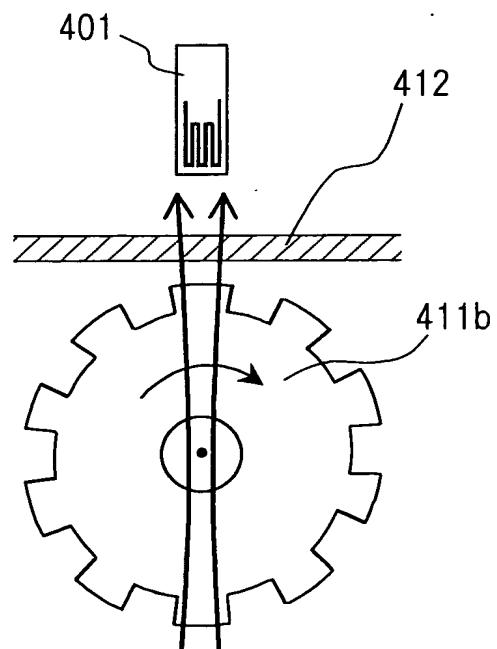


FIG. 36

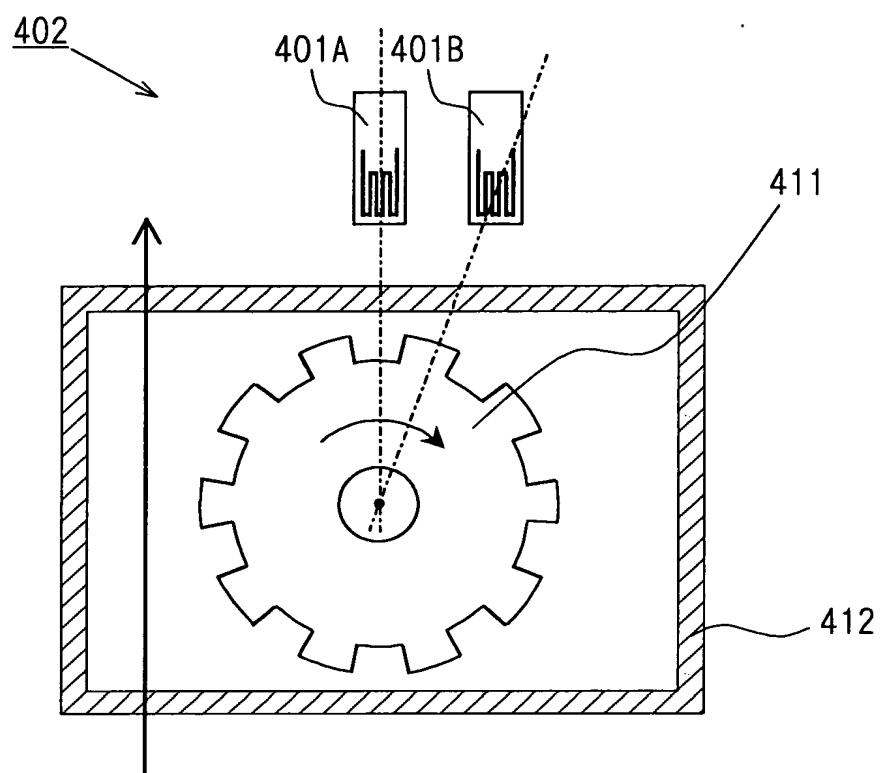


FIG. 37

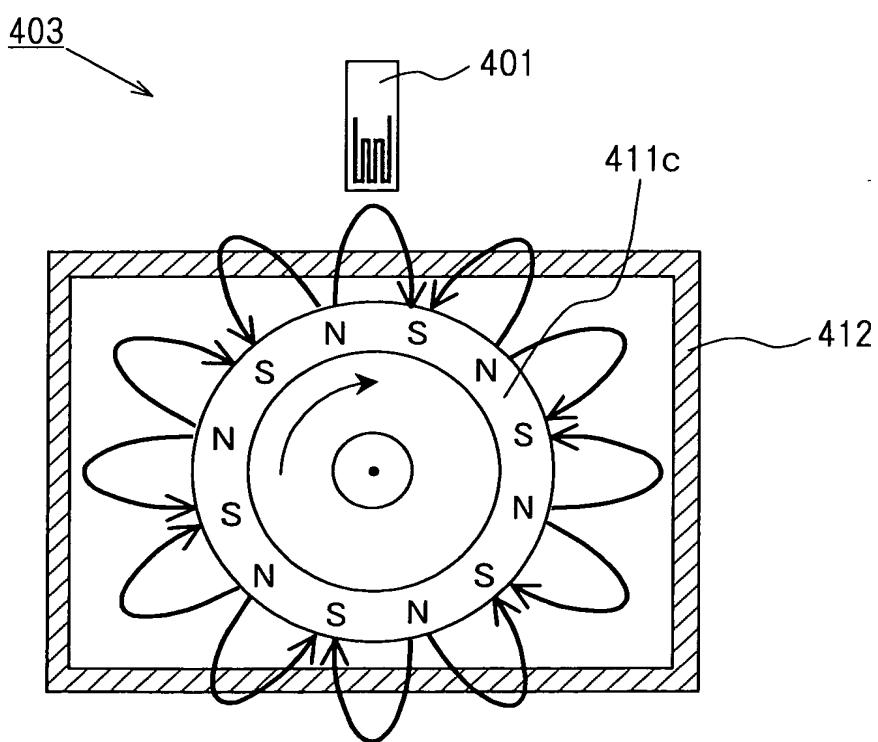


FIG. 38A

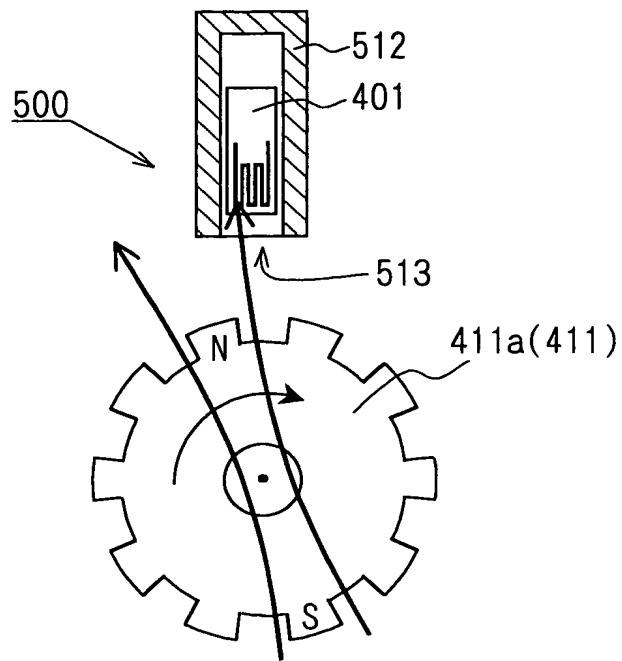


FIG. 38B

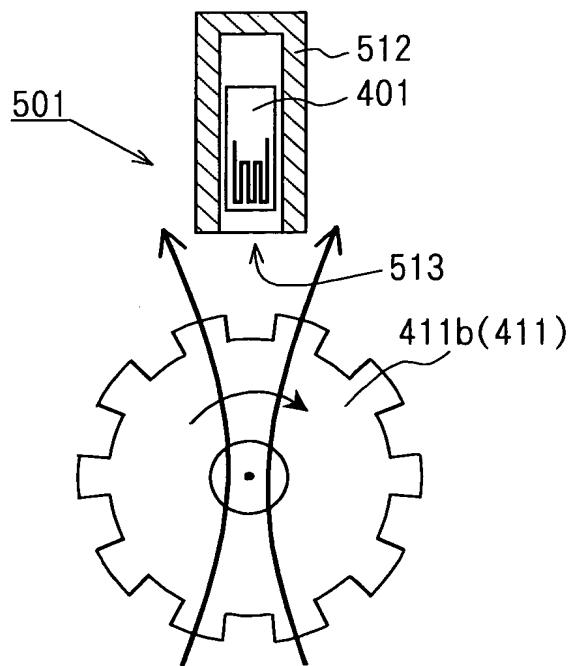


FIG. 38C

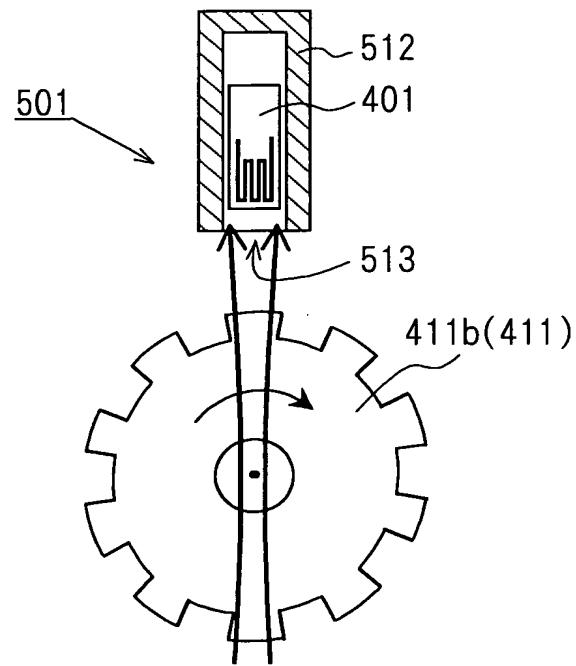


FIG. 39

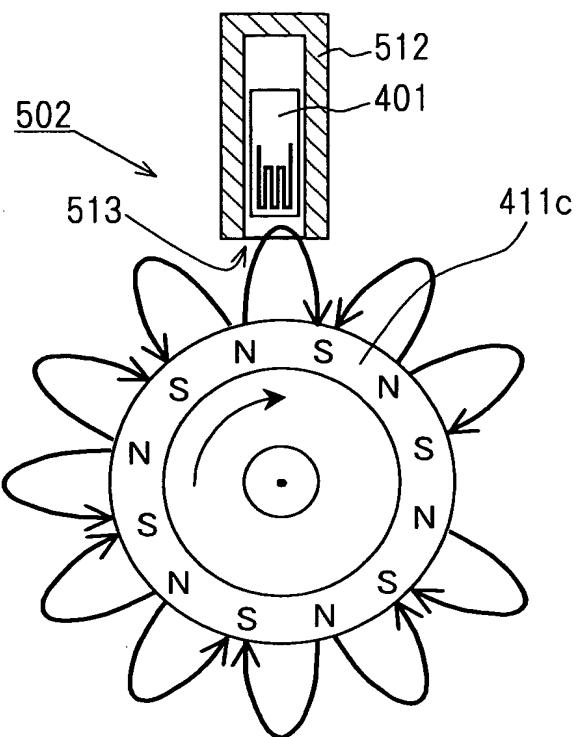


FIG. 40A

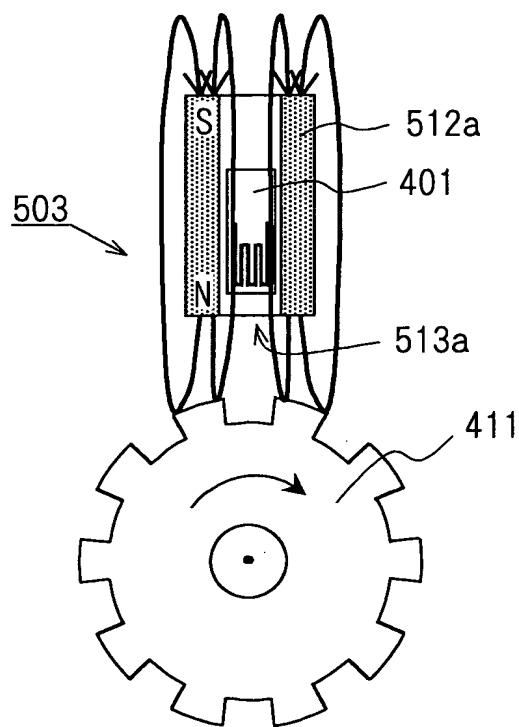


FIG. 40B

